

Summary of the Office Action

The Office Action rejects claims 1, 3-6, 8, 9, and 16-27 under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent 5,770,095 (Sasaki et al.) (hereinafter “the Sasaki ‘095 patent”) in view of U.S. Patent 5,783,489 (Kaufman et al.) (hereinafter “the Kaufman ‘489 patent”). The Office Action also objects to claims 32-35 as reciting allowable subject matter but depending from a rejected base claim.

Discussion of the Section 103 Rejection

The Office Action rejects claims 1, 3-6, 8, 9, and 16-27 as allegedly obvious over the Sasaki ‘095 patent in view of the Kaufman ‘489 patent. In particular, the Office Action asserts that the Sasaki ‘095 patent discloses a polishing agent comprising water, an abrasive, an etching agent (e.g., an aminoacetic acid in combination with an oxidizing agent), and a chemical agent which reacts with the substrate surface to form a protective film thereon (e.g., benzotriazole or an octanephosphonic acid). The Office Action also asserts that the Kaufman ‘489 patent discloses a polishing slurry comprising a diphosphonic acid, such as aminotri(methylenephosphonic) acid or 1-hydroxyethylidene-4-diphosphonic acid. The Office Action further asserts that it would have been obvious for one of ordinary skill in the art to substitute the diphosphonic acids disclosed in the Kaufman ‘489 patent for the phosphonic acids of the Sasaki ‘095 patent, thereby arriving at the invention defined by the pending claims. Applicants respectfully traverse this rejection.

Contrary to the Office Action’s assertions, the invention defined by the pending claims is not *prima facie* obvious over the combination of the Sasaki ‘095 and Kaufman ‘489 patents. There are three criteria required to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation to combine the references in the asserted manner. This suggestion or motivation can be found within the references themselves or in the knowledge generally available to one of ordinary skill in the art at the time of invention. Second, one of ordinary skill in the art must have reasonably expected that the proposed modification or combination would succeed. Third, the combined references must teach or suggest all of the elements recited in the claims. M.P.E.P. § 2142. In the present case, there is nothing within the cited references which would have motivated one of ordinary skill in the art to combine the teachings of the references in such a way as to arrive at the present invention. Moreover, the express teachings of each reference would have discouraged any such combination and would have suggested that such combination would fail.

To the extent that the Sasaki ‘095 patent discloses a polishing composition comprising phosphonic acids, such phosphonic acids are selected from a group of “chemical agents

forming a protection film by reacting" with the metal-containing substrate (see, e.g., the Sasaki '095 patent at col. 3, lines 38-54). By way of contrast, the Kaufman '489 patent only discloses the use of phosphonic acids as stabilizers, which are used to prevent settling and flocculation of the abrasive particles contained in a polishing composition (the Kaufman '489 patent at col. 6, lines 49-59). There is nothing within either of the cited references which teaches or suggests that the particular phosphonic acids disclosed in the Kaufman '489 patent would function as the film-forming agent disclosed in the Sasaki '095 patent. Furthermore, one of ordinary skill in the art, at the time of invention, would not have expected the particular phosphonic acids disclosed in the Kaufman '489 patent to function as film-forming agents. Indeed, the express teachings of the references plainly set forth the different functions of each class of phosphonic acids: film-forming agent (to *protect* substrate surface) versus stabilizer (for abrasive that *removes* substrate surface). Thus, in order to combine the references, one of ordinary skill in the art would have to ignore the explicit teachings contained within one of the cited references regarding the function of the phosphonic acid. See M.P.E.P. § 2143.02 (noting that, in order to properly support a *prima facie* obviousness rejection, a proposed modification or combination cannot change the principle of operation of a reference).

Moreover, the Sasaki '095 patent fails to teach or suggest the need for a stabilizer to prevent settling and flocculation of the abrasive particles. Indeed, the Sasaki '095 patent fails to even mention settling or flocculation, much less teach or suggest that the abrasive particles contained in the polishing composition are, or can become, colloidally unstable. Therefore, nothing within the Sasaki '095 patent or the knowledge generally available to those of ordinary skill in the art at the time of invention which would have motivated one of ordinary skill in the art to look to the Kaufman '489 patent for additional phosphonic acid film-forming agents or stabilizers. Accordingly, the Office Action fails to identify any motivation to combine the Sasaki '095 and Kaufman '489 patents, much less a motivation to combine them in such a way as to arrive at the invention defined by the pending claims.

Even if there were a motivation to combine the Sasaki '095 and Kaufman '489 patents, which there is not, one of ordinary skill in the art, at the time of invention, would not have reasonably expected such combination to succeed. As noted above, the Sasaki '095 patent only discloses the use of phosphonic acids as film-forming agents. To that end, the phosphonic acids comprise a long, saturated alkyl chain, which renders the molecule hydrophobic and enables it to protect the surface of the metal-containing substrate from the chemical action of the aqueous polishing composition (see, e.g., col. 3, lines 17-24). By way of contrast, the particular phosphonic acids disclosed in the Kaufman '489 patent act as stabilizers for the abrasive particles contained in the polishing composition. As such, the

disclosed phosphonic acids comprise short alkyl chains which are substituted with polar functional groups (see, e.g., the Kaufman '489 patent at col. 6, lines 49-55). These short alkyl chains and polar functional groups render the molecules hydrophilic, allowing them to remain in the aqueous phase of the polishing composition where they interact with the surface of the abrasive particles, thereby preventing settling or flocculation of the abrasive particles. Thus, in view of the functional and structural differences between the phosphonic acids disclosed in the Sasaki '095 and Kaufman '489 patents, one of ordinary skill in the art, at the time of invention, would not have expected the combination of the two references to succeed.

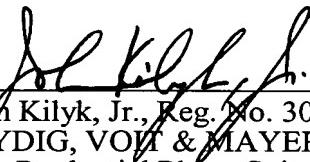
More specifically, one of ordinary skill in the art would not have expected the hydrophilic phosphonic acids of the Kaufman '489 patent to function as the film-forming agent called for in the Sasaki '095 patent. Indeed, having read the Kaufman '489 patent, one of ordinary skill in the art would have expected the particular phosphonic acids disclosed in the Kaufman '489 patent to be "consumed" by interactions with the abrasive particles contained in the polishing composition, leaving little to nothing to interact with the substrate surface. Moreover, one of ordinary skill in the art would not have reasonably expected the hydrophilic phosphonic acids disclosed in the Kaufman '489 patent to effectively protect the substrate surface from the chemical action of the aqueous polishing composition. It would have been more reasonable to expect that such hydrophilic phosphonic acids would have accelerated, rather than inhibited, the chemical action of the aqueous polishing composition. Indeed, as can be seen from Examples 1, 3, 4, 5, and 6 of the specification of the present application, the addition of a polyphosphonic acid similar to those disclosed in the Kaufman '489 patent *substantially increases* the polishing rate of a polishing composition, as opposed to inhibiting the polishing rate as required by the Sasaki '095 patent. Accordingly, one of ordinary skill in the art, at the time of invention, would not have reasonably expected the combination of the Sasaki '095 and the Kaufman '489 patents to succeed.

In view of the foregoing remarks, the Office Action fails to set forth a *prima facie* obviousness case based on the cited references. As noted above, there is nothing within the references themselves or the knowledge available to those of ordinary skill in the art which would have suggested the proposed combination. Furthermore, in view of the teachings of the cited references, one of ordinary skill in the art would not have reasonably expected the proposed combination to succeed. The rejection under Section 103, therefore, should be withdrawn.

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,


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Date: March 13, 2003

CERTIFICATE OF MAILING

I hereby certify that this RESPONSE TO OFFICE ACTION (along with any documents referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231.

Date: March 13, 2003

